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EXAMINER	
BARON, HENRY	

ART UNIT	PAPER NUMBER
2416	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/530,812	SKERRITT, MICHAEL	
	Examiner	Art Unit	
	HENRY BARON	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 3/16/2009.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 and 3-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,3-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

SYSTEM AND METHOD FOR BUFFER MANAGEMENT IN A PACKET-BASED NETWORK

Response to Arguments/Remarks

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 16, 2009 has been entered.

2. Applicant notes initially that a request to suspend prosecution has been requested with the Request for Continued Examination filed concurrently herewith and this case should not be taken up for further examination until expiration of the suspension period.

3. Examiner replies that Applicant's request filed on March 16, 2009, for deferral of examination under 37 CFR 1.103(d) in the application is denied as being improper. Applicant has not filed a petition to suspend prosecution stating the cause of suspension.

4. Claims 1 – 22 are pending in the instant application. Claim 2 is cancelled.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

6. A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3 – 5 and 8 –9 are rejected under 35 U.S.C. 102(b) as being anticipated by Miao (U.S. Patent 6937603).

8. In consideration of claim 1, Miao teaches of a communication system for use with a packet-based network comprised of a first node configured to transmit data in data packets across the network; a second node configured to receive the data packets from the network and serialize the data. (Figure 1 and 1: [0031] + read [t]e audio from telephone 101 to telephone 107 travels over a conventional public switched telephone network (PSTN) 102 and is received by gateway 103. The audio is then packetized and transmitted using an internet protocol and other well-known packet switching techniques to a gateway 105.. Since the packets often represent human voice, packets may not be presented out of order. Rather, the packets must be put into their original sequence i.e. serialized, at the receiving gateway 105.); where the second node comprises a buffer configurable to adjust to network packet delay variance through analysis of packet delay variance over at least one period of time. (1: [0062] read [a] buffer may be provided at the receiving gateway to hold packets. The buffer introduces an additional delay at the receiving gateway, but permits packets arriving out of order to be rearranged in sequence; 2: [0025] read [i]n order to optimize the buffer latency in such systems, typically, a statistical estimate of packet delays is calculated or arrived at empirically (3: [0011] read [i]n a preferred embodiment, the updating is done in a recursive fashion, i.e. over at least one time period, or it may be accomplished after the transmission of every Nth packet, where N is a finite number (3: [0030] read [i]n a preferred embodiment, the histogram is updated when every Nth packet is received or for every predetermined interval of time i.e. one period of time). Miao, further teaches of a communication system where the packet delay variance measurement includes monitoring, for the at least one period of time, a buffer depth of the buffer, the buffer depth being a temporal measurement of a delay a data packet encounters from when the data packet is received by the buffer to when the data packet is serialized. (4: [0010] read it can be seen that the greater is the delay variation, the greater is the value of σ, and thus the longer is the buffer size i.e. buffer depth required in a receiver to insure a given packet loss probability.)

9. In consideration of claims 3, Miao teaches of a communication system where the buffer has a configurable parameter settings for adjusting the buffer in accordance with the packet delay variance analysis (3: [0018] read [a]s each packet arrives, it is placed into a buffer and delayed an amount of time ta i.e. parameter setting. The buffer delay ta is equal to the network transmission delay experienced by that packet subtracted from the optimal delay, ted, which a packet may experience for a given probability of packet loss. Thus, each packet is given a customized delay i.e. configurable parameter, at the receiver so that its total delay equals ted.)

10. With regards to claim 4, Miao teaches of a buffset parameter for determining a period of time for data to be accumulated into the buffer before being serialized. (3: [0018] read [a]s each packet arrives, it is placed into a buffer and delayed an amount of time ta i.e. buffset parameter. The buffer delay ta is equal to the network transmission delay experienced by that packet subtracted from the optimal delay, ted, which a packet may experience for a given probability of packet loss. Thus, each packet is given a customized delay i.e. configurable parameter, at the receiver so that its total delay equals ted. Regarding serialized, Figure 1 and 1: [0031] + read [t]e audio from telephone 101 to telephone 107 travels over a conventional public switched telephone network (PSTN) 102 and is received by gateway 103. The audio is then packetized and transmitted using an internet protocol and other well-known packet switching techniques to a gateway 105.. Since the packets often represent human voice, packets may not be presented out of order. Rather, the packets must be put into their original sequence i.e. serialized, at the receiving gateway 105.).

11. Regarding claim 5, Miao teaches of a receiving point that has a normal distribution with mean value μ and standard deviation σ, where μ represents the average network delay and σ the variance. (3: [0058] read the horizontal axis t represents the delay of a particular packet between a transmitting point and a receiving point, which has a distribution P(t) with a mean value μ and a standard deviation σ. In the figure, μ represents the average delay experienced by a packet when it travels from the transmitting point

to the receiving point. If there were no delay variations (i.e., σ=0), the packets will be received at the receiving point in an order that is the same as the order in which packets leave the transmitting point. No buffering will then be needed in such a situation i.e. the average buffer depth determined by averaging instantaneous measurements of the buffer depth over a determined period of time. Miao also teaches in 4: [0010] that the greater is the delay variation, the greater is the value of σ, and thus the longer is the buffer size i.e. a buffmax parameter for setting an upper bound on an average buffer depth, required in a receiver to insure a given packet loss probability. Pictorially, the wider the curve in FIG. 3, the longer the buffer at the receiver has to be to guarantee a specified packet loss probability. Conversely, with the same standard deviation, reducing the buffer size i.e. a buffmin parameter for setting a lower bound on the average buffer depth would cause increasing number of packets to become lost.).

12. In regards to claim 8, Miao teaches of a communication system where the first node comprised of a transmitting clock, and second node comprised of a receiving clock, are synchronized under nominal operating conditions. (5: [0033] read FIG. 5 is a flow chart describing functions that relate to the buffering and delay of packets being received in a receiving gateway according to an example embodiment. The flow chart is entered at block 500 and control is transferred to operational block 501. The functions of operational block 501 are to synchronize the clocks present at the transmitting gateway 103 and the receiving gateway 105 of FIG. 1, which are used to determine a transmitting time at gateway 103 and a receiving time at gateway 105 in the time field for each packet, respectively.)

13. In consideration for claim 9, Miao teaches of a communication system where the second node additionally comprises a serializer. (1: [0031] + read [t]e audio from telephone 101 to telephone 107 travels over a conventional public switched telephone network (PSTN) 102 and is received by gateway 103. The audio is then packetized and transmitted using an internet protocol and other well-known packet switching techniques to a gateway 105.. Since the packets often represent human voice, packets may not be presented out of order. Rather, the packets must be put into their original sequence i.e. serialized, at

the receiving gateway 105 (7: [0026] read as indicated pictorially in the figure, the packet delay measurement blocks 702 simultaneously receives a copy of the received packet and measures the packet delay based upon the time stamp i.e. serializer in the received packet and present time indicated on the clock in the receiving gateway.).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

15. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claim 6 is rejected under 35 U.S.C. 103(a) over Miao (U.S. Patent 6937603) in view of Chen (U.S. Patent 6859460).

17. Regarding claim 6, Miao teaches if the average buffer depth i.e. ted, is within a proximity threshold of the buffmax parameter setting i.e. σ, the second node adjusts the buffmax parameter setting. (Abstract read ..packet delays are dynamically recorded for forming a histogram of the frequencies of occurrence associated with each delay. The histogram is updated plural times during a single session. An optimal latency is obtained from the updated histogram at which the packet loss percentage is within a predetermined amount and the optimal latency is less than an allowable maximum delay required by the application. The size of the buffer is thus adjusted.)

18. However, Miao does not explicitly teach of where if the average buffer depth is within a first proximity threshold of the buffmax parameter setting, the second node increases the buff max parameter setting; and, where if the average buffer depth is outside a second proximity threshold of the buff max parameter setting, the second node decreases the buffmax parameter setting.

19. Chen teaches if the average buffer depth is within a first proximity threshold of the buffmax parameter setting, the second node increases the buff max parameter setting; and, where if the average

buffer depth is outside a second proximity threshold of the buff max parameter setting, the second node decreases the buffmax parameter setting. (Figure 8b element 210 and Figure 8c element 235 2: [0033] read [a] delicate balance lies between the need to eliminate jitter and the need to reduce latency. Further, the network traffic condition varies continuously. Accordingly, when network traffic is low, the jitter buffer may be too large, thereby introducing unnecessary latency. However, when network load is high, the jitter buffer may be too small such that network perturbations, for example, packet loss and jitter, will cause audible distortion on the voice conversation. In addition, for Internet devices having a fixed jitter buffer depth, when the jitter buffer is too large, the unused memory resources in the system are not available to perform other function (2: [0054] read [I]n accordance with one aspect of the present invention, the system includes a buffer, a clock, a comparison module, and a buffer depth adjuster. The received data is stored in the buffer, and the clock determines the arrival-time of the data. By comparing the arrival-time and the playback-time of the data, the comparison module determines whether that data arrived on schedule. If the data did not arrive on schedule, the buffer depth adjuster can alter the depth of the buffer.)

20. It would have been obvious at the time the invention was made by a person of to having ordinary skill in the art to modify the teachings average buffer depth of Miao with the dynamic buffer depth adjuster of Chen to adjust the buffmax parameter setting so that if the average buffer depth is within a first proximity threshold of the buffmax parameter setting, the second node increases the buff max parameter setting; and, where if the average buffer depth is outside a second proximity threshold of the buff max parameter setting, the second node decreases the buffmax parameter setting.

21. In this manner packet loss probability and buffer latency can be adjusted to reflect the variations in the network delays and assuring that the message of the packet group are delivered.

22. Claims 7 and 10 – 22 are rejected under 35 U.S.C. 103(a) over Miao (U.S. Patent 6937603) in view of Strawn (U.S. Patent 5,517,521).

23. In consideration of claim 7, Miao teaches the limitations of claim 5, but is silent regarding the second node using a clock signal for serializing the data packets received by the buffer where if the average buffer depth is within a first proximity threshold of the buff min parameter setting, the clock signal frequency is decreased; and, wherein if the average buffer depth is outside a second proximity threshold of the buff min parameter setting, the clock signal frequency is increased.

24. Strawn teaches of second node using a clock signal for serializing the data packets received by the buffer where if the average buffer depth is within a first proximity threshold of the buff min parameter setting, the clock signal frequency is decreased; and, wherein if the average buffer depth is outside a second proximity threshold of the buff min parameter setting, the clock signal frequency is increased. (1: [0055] read [o]ne of the two transceivers engaged in the communications session will have originated the session, and is referred to as the originate node. The other of the transceivers is referred to as the answer node i.e. second node. At each end of the radio connection, timing is derived from an oscillator. The oscillator employed in the originate node operates at a fixed frequency, designated F.sub.ctr. The oscillator at the answer node warbles between a first frequency F.sub.hi, slightly higher than F.sub.ctr, and a lower frequency F.sub.Lo, slightly lower than F.sub.ctr. The difference between F.sub.hi and F.sub.ctr is referred to as df. … The receive FIFO contents slowly expands and contracts cyclically, averting overflow and underflow conditions which would result in disruption of the isochronous data flow.).

25. It would have been obvious at the time the invention was made by a person of to having ordinary skill in the art to modify the PDV teaching of Miao with the clock adjustment with the clock adjustment teachings with Strawn.

26. With such a modification, the second node can regulate the rate of receipt of packets when the receive buffer is almost empty or full. The second node then has an additional degree of freedom i.e. clock frequency in regulating the receive buffers.

27. In regards to claims 10, 12 – 13, 18, 20, and 22 Miao teaches a flow control method for managing a buffer in a node of a packet-based network, where the buffer has configurable buffset, buffmax and buffmin parameters, and node uses a clock comprising: (a) setting initial values for the buffset, buffmax and buffmin parameters; (b) measuring buffer depth over a period of time; (c) re-centering the buffer if an underflow event or an overflow event is detected; and (d) adjusting buffset, buffmax and buffmin parameters. (3: [0058] read (a) the horizontal axis t represents the delay of a particular packet between a transmitting point and a receiving point, which has a distribution P(t) with a mean value μ and a standard deviation σ. In the figure, μ represents the average delay experienced by a packet when it travels from the transmitting point to the receiving point i.e. buffset. 4: [0010] read that the greater is the delay variation, the greater is the value of σ, i.e. buffmax and bufmin. and thus the longer is the buffer size i.e. a buffmax parameter for setting an upper bound on an average buffer depth, required in a receiver to insure a given packet loss probability. Pictorially, the wider the curve in FIG. 3, the longer the buffer at the receiver has to be to guarantee a specified packet loss probability. Conversely, with the same standard deviation, reducing the buffer size i.e. a buffmin parameter for setting a lower bound on the average buffer depth. would cause increasing number of packets to become lost. 3: [030] read [i]n a preferred embodiment, the histogram is updated when every Nth packet is received or for every predetermined interval of time i.e. one period of time i.e. adjusting buffset, buffmax and buffmin.).

28. However, Miao does not teach of adjusting the clock according to measured buffer depth.

29. Strawn teaches of adjusting the clock according to measured buffer depth (1: [0055] read [o]ne of the two transceivers engaged in the communications session will have originated the session, and is referred to as the originate node. The other of the transceivers is referred to as the answer node i.e. second node. At each end of the radio connection, timing is derived from an oscillator. The oscillator employed in the originate node operates at a fixed frequency, designated F.sub.ctr. The oscillator at the answer node warbles between a first frequency F.sub.hi, slightly higher than F.sub.ctr, and a lower

frequency F.sub.Lo, slightly lower than F.sub.ctr. The difference between F.sub.hi and F.sub.ctr is referred to as df. … The receive FIFO contents slowly expands and contracts cyclically, averting overflow and underflow conditions which would result in disruption of the isochronous data flow.).

30. It would have been obvious at the time the invention was made by a person of to having ordinary skill in the art to modify the PDV teaching of Miao with the clock adjustment with the clock adjustment teachings with Strawn.

31. With such a modification, the second node can control the flow rate of receipt of packets when the receive buffer is almost empty or full. The second node then has an additional degree of freedom i.e. clock frequency in regulating the receive buffers.

32. Regarding claim 11, Miao teaches the step comprised of monitoring the buffer for the period of time to acquire instantaneous buffer depth measurements. (2: [0025] read [i]n order to optimize the buffer latency in such systems, typically, a statistical estimate of packet delays is calculated or arrived at empirically (3: [0011] read [i]n a preferred embodiment, the updating is done in a recursive fashion, i.e. over at least one time period, or it may be accomplished after the transmission of every Nth packet, where N is a finite number (3: [0030] read [i]n a preferred embodiment, the histogram is updated when every Nth packet is received or for every predetermined interval of time i.e. one period of time).

33. Regarding claims 14 and 15, Miao in modification with Strawn teaches the limitations of claim 10 and 14 respectively, and Miao teaches of an overflow condition when the buffer depth is compared with the buffmax parameter. (Figure 3, packet loss probability).

34. With regards to claim 16, Miao teaches re-centering comprised of discarding any data packets in the buffer (4: [0001] read there is also a lower bound tL for network delays. ted can be set in advance by the designer's choice of an acceptable probability of packet loss. For example, an acceptable packet loss probability of 2% would imply a specific ted. For a given distribution, 2% of the packets experience delays of longer than ted.).

35. In regards to claim 17, Miao teaches if an underflow or overflow event is detected, the step of increasing an overflow or underflow event count, and comparing the overflow or underflow event count to a threshold to determine if a gross adjustment is to be made to buff set. (3: [0058] read (a) the horizontal axis t represents the delay of a particular packet between a transmitting point and a receiving point, which has a distribution P(t) with a mean value μ and a standard deviation σ. In the figure, μ represents the average delay experienced by a packet when it travels from the transmitting point to the receiving point i.e. buffset. 4: [0010] read that the greater is the delay variation, the greater is the value of σ, i.e. buffmax and bufmin. and thus the longer is the buffer size i.e. a buffmax parameter for setting an upper bound on an average buffer depth, required in a receiver to insure a given packet loss probability. Pictorially, the wider the curve in FIG. 3, the longer the buffer at the receiver has to be to guarantee a specified packet loss probability. Conversely, with the same standard deviation, reducing the buffer size i.e. a buffmin parameter for setting a lower bound on the average buffer depth. would cause increasing number of packets to become lost. (b,d) 3: [030] read [i]n a preferred embodiment, the histogram is updated when every Nth packet is received or for every predetermined interval of time i.e. one period of time i.e. adjusting buffset, buffmax and buffmin.).

36. In consideration of claims 19 and 21, Miao in modification with Strawn teaches the limitations of claim 20, but neither reference teach of setting buffer parameters, buffmin, buffmax and buffset to pre-processing values, rather these parameters are processed recursively.

37. It would have been obvious at the time the invention was made by a person of to having ordinary skill in the art to modify the teachings of Miao and Strand to set the buffer parameters to pre-processing values.

38. In this way, once operational, the recursive buffer parameters can be processed faster.

Conclusion

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Henry Baron whose telephone number is (571) 270-1748. The examiner can normally be reached on 7:30 AM to 5:00 PM E.S.T. Monday to Friday.

40. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

41. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. B./
Examiner, Art Unit 2416
HB

/Kevin C. Harper/

Primary Examiner, Art Unit 2416